Remarks/Arguments

Claims 1-18 are canceled by this amendment, and new claims 19 - 35 are presented.

35 U.S.C. §103

Claims 1-4 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,986,640 to , et al. ("Baldwin"), and further in view of U.S. patent No. 6,373497 to McKnight, et al ("McKnight"). New claims 19-35 are presented. It is believed applicant's remarks will preclude arguments for rejection of the new claims based upon the art cited against the canceled claims.

Baldwin

Regarding claim 1, the office action states Baldwin teaches a method of reducing contouring in a display, because Baldwin discloses, "'dynamic contouring' can be reduced by manipulation of the time division multiplex addressing scheme", see lines 44-46 of column 2 of Baldwin.

However, Baldwin's teaching is limited to a particular type of contouring effect referred to as "dynamic contouring". Baldwin defines "dynamic contouring", as "changes in [overall] illumination level between adjacent time **frames**. (Baldwin, col. 10 lines 33-37). Applicant does not claim to reduce dynamic contouring.

Baldwin's teaching is applicable only to displays comprising binary light elements, for example, displays comprising mirror devices as light elements (pixels). Dependent on the applied address signal, each mirror (pixel) can take only one of two different positions corresponding to an "on" state wherein reflected light is directed along a first path, and an "off" state, wherein light is directed along a second path. (Baldwin col 4, lines 7-11).

Therefore, one of ordinary skill in the art would readily appreciate that gamma correction is not applicable to binary light elements, therefore manipulation of the time division multiplex addressing scheme for binary light elements would not correct for a problem arising from the resolution of a gamma table. Binary light elements have no analogous transfer function and therefore do not need gamma correction for the non linearity of their illumination response. In fact, Baldwin teaches to remove the gamma correction signal from the input signal. Therefore, Baldwin teaches away from using gamma correction.

While gamma correction is of no use in Baldwin's display, it is useful in the type of display wherein an individual pixel can have any of a plurality of luminance levels. Gamma correction compensates for the non linearity in the luminance of the pixel in response to pixel drive signals. So, in spite of Baldwin's teaching to remove gamma correction, applicant teaches to provide gamma correction for the display elements.

However, applicant recognized that gamma correction, while desirable, introduced a contouring effect (one that is not related to the dynamic contouring effect of Baldwin.) Applicant's claimed invention reduces this contouring effect while still providing gamma correction to the signal, and without the need to increase the resolution of the gamma table itself. Therefore, it is clear that applicant's claimed invention recites a limitation that calls for applying gamma correction to an input signal. Specifically, applicant's claim 19 recites steps of, "applying a first set of gamma correction values to a first picture portion of each of said successive pictures to provide corresponding gamma corrected first picture portions for each successive picture" and "applying a second set of gamma correction values to a second picture portion of each of said successive pictures to provide corresponding gamma corrected second picture portions for each picture." Applicant's system claim recites the following system element: "said system including an imager coupled to a gamma correction unit to cause said imager to operate in accordance with a gamma corrected transfer function." Applicant's claims are clearly in direct contradiction to Baldwin's teaching to **remove the gamma correction signal**.

The office action states Baldwin teaches, "the video signals representing the red, green and blue colour components of the image to be displayed, is applied to an analogue to digital converter (ADC) unit 129 together with a synchronizing signal. The output of the ADC unit 129 is applied to a gamma correction unit 131 to **remove the gamma correction** signal". (See Baldwin lines 12-20 of column 12 and Fig. 14). The office action further states, "While the claim recites dither, it is clear that the dither is defined as modifying gamma value, which is disclosed by Baldwin. Thus, the office action concludes the dither limitation of claim 1 is met.

Applicant respectfully disagrees that Baldwin discloses modifying gamma value. Baldwin discloses only removing the gamma correction signal so no gamma correction is provided. Regardless, applicant's new independent method claim does not recite a step of modifying gamma correction values, but applicant's claim does recite a step of **applying** gamma correction values to a signal. This is in direct contradiction to Baldwin's teaching to remove the gamma correction signal. Applicant's new independent system claim

recites "a dithering unit coupled to said system to reduce the number of said repeated displayed pixel brightness levels corresponding to different intended pixel brightness levels." However it is clear from another limitation in the same claim that applicant does **not** apply dither to **remove a gamma correction signal,** as taught by Baldwin. Speicifically, applicant's claim recites a further limitation of "an imager coupled to a gamma correction unit to cause said imager to operate in accordance with a gamma corrected transfer function." Thus it is clear applicant does not define dithering as removing or modifying a gamma correction signal. Applicant uses the term dithering in the broad sense as the term is defined in "The Random House College Dictionary, Revised Edition, 1975 on page 387 column 1: dither, ...to vacillate." The term "vacillate" is defined by the same reference on page 1451 second column" vacillate...to fluctuate. Therefore applicant's dither causes a value to fluctuate. A "dither unit" is a unit that causes a value to fluctuate. This is clear from applicant's specification, for example, on page 2 paragraph 20, wherein applicant describes applying "a one least significant bit dither" to the input signal. In other words, a one least significant bit dither causes the least significant bit of a signal to fluctuate. Baldwin does not teach or suggest causing gamma values to fluctuate. Baldwin teaches to remove the gamma signal entirely from the input signal. One of ordinary skill in the art would clearly not take a teaching of "removing a gamma correction signal" as a suggestion to apply a gamma value to signal, whether or not the applied gamma signal fluctuates.

Specifically, new independent claim 19 recites "a method of reducing contouring in a liquid crystal on silicon (LCOS) display comprising individually controllable pixels, the display including at least one gamma correction table having a corresponding table resolution, the method comprising the steps of: providing an input signal comprising successive pictures to be displayed on said display; **applying a first set of gamma correction values** to a first picture portion of each of said successive pictures to provide corresponding gamma corrected first picture portions for each successive picture; **applying a second set of gamma correction values** to a second picture portion of each of said successive pictures to provide corresponding gamma corrected second picture portions for each picture; combining said gamma corrected first picture portion with said gamma corrected second picture portion to provide a picture comprising pixels having brightness levels determined by the combined picture portions; reducing the number of said pixels having repeated brightness levels in successive pictures without changing said table resolution.

New independent claim 32 recites "a system for reducing contouring caused by repeated displayed pixel brightness levels in a liquid crystal on silicon (LCOS) display, the system comprising: a receiver for receiving an input signal comprising successive pictures, each of said successive pictures having a corresponding intended brightness level for each pixel; a display for displaying each of said successive pictures with a displayed pixel brightness level for each pixel; a system for transferring each of said pictures from said receiver to said display such that said displayed brightness levels of said pixels approximately matches said intended brightness levels of said pixels for each successive picture; said system characterized by a transfer function relating said displayed pixel brightness levels to said intended pixel brightness levels, said transfer function including an imager gamma; **said system including an imager coupled to a gamma correction unit to cause said imager to operate in accordance with a gamma corrected transfer function**; said gamma corrected transfer function having associated therewith a number of repeated displayed brightness levels corresponding to different intended brightness levels; a dithering unit coupled to said system to reduce the number of said repeated displayed pixel brightness levels corresponding to different intended pixel brightness levels.

In view of the arguments presented above, applicant does not believe the Baldwin reference is applicable to applicant's claims, either solely or in combination with any other reference to arrive at applicant's claimed invention. Further Baldwin teaches away from applicant's claimed invention, in that Baldwin teaches to remove a gamma correction signal and applicant teaches to apply gamma correction.

McKnight

Applicant agrees with the office action that LCOS displays having frame doubled input signals comprising positive and negative pictures are known in the art taught by McKnight. The office action states, "therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching of McKnight to provide a display with faster performance by using a LCOS." The question of whether it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching of McKnight to provide a display with faster performance by using a LCOS is not relevant to an obvious determination relating to applicant's claimed invention. Applicant does not claim to have invented LCOS displays with faster performance. Applicant believes the relevant question is whether it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching

of McKnight to provide an LCOS display including the invention recited in applicant's claims.

Applicant submits there is no teaching in the references applicable to applicant's invention. The patent office has not cited any suggestion in the references, or any motivation in the general knowledge of art, that any teaching of the references could be combined to arrive at applicant's claimed invention.

The dependent claims in the application are believed to be allowable in view of the cited references as they depend from independent claims believed allowable.

Accordingly, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

No fee is believed due. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,

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Natalie Brottman